REMARKS

Claims 1-34 are pending in the application. Claims 1, 5-8, and 24-27 have been amended to further clarify Applicants' invention. New claim 35 has been added, which is supported at least by paragraphs 85-89 of the specification. No new matter has been added. The following remarks, in conjunction with the above presented amendments, are believed to be fully responsive to the Office Action mailed on June 17, 2005 (the "Office Action") in this application. Claims 1, 28, 30 and 32 are the independent claims. Favorable reconsideration is requested.

Rejection of Claims 1, 7, 11, 25 and 27-33 Under 35 U.S.C. 112

Claims 1, 7, 11, 25 and 27–33 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The Office Action states that regarding "the phrase 'optimum viewing point' it is not understood as to how one determines what is 'optimum viewing point' should be." Office Action at 2. The Office Action therefore concludes that these claims, reciting this phrase, are vague and ambiguous.

Applicants respectfully traverse. In the specification applicants have specifically indicated the meaning of "optimum viewing point." The Examiner's attention is directed to Paragraph 36, appearing on page 3 of the published application, wherein the phrase "optimum viewing point" is defined as the "center or near center point of the display screen at the apparent depth of the display screen." The optimum viewing point is thus a defined point in the display space (x,y,z) where a user can optimally comfortably examine a set of points in model space (u,v,w). Besides being defined in the specification, this terminology is well known to those skilled in the art.

As is described in the specification, the present invention is directed to three-dimensional interactive displays of 3D datasets. Specification at ¶ 40. In any such display system there are portions of the screen which users, in most contexts, tend to regard as more optimum than others. In general, the center of a screen or a "sweet spot" comprising a certain region at the center of the screen are considered optimum viewing points inasmuch as a user seated directly in front of the display screen tends to look at the center of the screen. This fact is similar to the practice of motion picture directors to place critical action in a scene at the center of the camera frame. Thus, when an audience watches a movie, it finds the critical action happening in the approximate center of the screen. Similarly, as described in the specification, when viewing a 3D dataset, if users wish to examine a portion of it in detail, such as via a scaling or zoom operation, such users find it natural and comfortable to examine such a region of interest at such an optimum viewing point, even if the zoom was signaled with reference to a point far from the optimum viewing point.

For at least the foregoing reasons, the rejection is misplaced and should be removed.

Applicants note that the lack of appreciation of the meaning of the optimum viewing point may have caused some confusion

Rejection of Claims 1-34 Under 35 U.S.C. 102(b)

Claims 1-34 stand rejected under 35 U.S.C. 102(b) as being unpatentable over U.S. Patent No. 5, 963, 213 to Guedalia ("Guedalia") in view of the United States Published Patent Application No. 2003/0043170 to Fluery ("Fleury"). This rejection is articulated relative to claim 1 at pages 3-4 of the Office Action. Similarly rejections are maintained against the remaining independent claims.

In the office action the Examiner initially reads Guedalia on all of the elements of claim 1 including automatically moving the model zoom point from its original position towards an optimum viewing point. Nonetheless, in the next paragraph (on page 4 of the Office Action), the Examiner admits that Guedalia does not specifically disclose "an optimum viewing point". Rather, such limitation is asserted in the Office Action as being shown in the teaching of Fluery. *Id.*, at page 4. Applicants reading of Guedalia does not discover any reference at all to an optimum viewing point, as admitted by the Examiner, and also does not discover any automatic motion of a model zoom point (or center of scaling) to such an optimum viewing point. Moreover, Fleury does not cure this defect of Guedalia, and thus even in combination there is no teaching of all of the elements of claim 1. Contrary to the Office Action at page 4, "restricting a point of interest within a view window" in Fleury is not the same as automatically moving a center of scaling to an optimum viewing point as is recited in claim 1. Thus, as described more fully below, Applicants respectfully traverse this rejection.

Claim 1 recites a method for controlling the scaling of a 3D computer model in a 3D display system. The claimed method includes activating a zoom mode, selecting a model zoom point; and setting a zoom scale factor. The method further includes implementing the zoom operation and automatically moving the model zoom point from its original position towards an optimum viewing point in response to the selected model zoom point and the set scale factor.

As described in the specification, in a zoom operation where the center of scaling (or model zoom point, *i.e.*, the point in the model which is the center of the zooming operation) is ***not*** the optimum viewing point, a situation as depicted in Fig. 2B can occur. In such a context the center of the zoomed object translates within the display space as a result of the zoom operation being centered at point 201, which has (x,y,z) co-ordinates not equal to (0,0,0) (those

are actually the co-ordinates of point 201 in Fig. 2A, which illustrates a zoom operation where the center of scaling ***is*** the optimum viewing point, where (x,y,z) = (0,0,0)). *Specification* at ¶ 49. This motion of the model under examination can be disconcerting to a user, as some or most of the model under examination can move out of an optimum viewing area of the display screen. One conventional way to ameliorate this problem is to only allow zooming operations when the model zoom point is precisely at the optimum viewing point. However, this imposes counter-intuitive constraints on a user while examining a model.

In exemplary embodiments of the present invention this problem can be solved by moving the center of scaling to the implementing an automatic translation of the model zoom point to a point at or near the optimum viewing point as the zoom operation is implemented. *Specification* at ¶¶ 85-89. Such translation can be a function of the scaling factor λ. *Id.* Thus, a user sees the model being zoomed and at the same time sees the model moving to an optimum viewing point. This adds to a user's comfort and convenience in examining a model. *Specification* at ¶ 86. The user is free to choose any point in the model as a model zoom point, and at the same time the system can automatically make that chosen point to lie at the optimum viewing point to provide maximum viewing comfort and convenience. *Id.* The automatic motion can be according to a defined algorithm, for example, a function of the distance between the chosen model zoom point and the optimum viewing point and the scaling factor λ. *Id.*

Guedalia is directed to two-dimensional images. In particular, a method of displaying a cylindrical source image, such as a "cylindrical panorama", onto a flat plane. This involves mapping pixels form the curved source image to a view plane according to certain rules. Guedalia describes conventional 2D zoom operations in that context. On page 3 of the

Office Action the Examiner first alleges that Guedalia at 3:7-19, 3:35-48, and 12:46-57 describes automatically moving a model zoom point from its original position towards an optimum viewing point. Respectfully, none of these citations have anything to do with moving the center of scaling within a display space or with optimum viewing points, and the Examiner admits at page 4 of the Office Action that Guedalia does not disclose the term or the concept "optimum viewing point." It does not. Thus, Guedalia cannot teach implementing a zoom operation and automatically moving the model zoom point from its original position towards an optimum viewing point according to a defined algorithm in response to the selected model zoom point and the set scaling factor, as is recited in claim 1 and the remaining independent claims.

Fleury describes navigating in a multi-scale 3D scene, such as a virtual oil well. It describes assigning reference shapes to 3D models. Fleury at ¶ 21. These shapes track the motion of 3D model objects. *Id.* Further, the Fleury system restricts the motion of points of interest ("POI") which a user examines and operates on within the 3D models to be within the associated reference shape. Fleury addresses a problem unique to less than optimal 3D visualization systems. The user cannot accurately choose a model zoom point (or model "pivot point") in 3D so it uses a 2D approximation. (It is noted that claim 1 of the present application is directed to model zoom points being selected in 3D, and thus the problem sought to be solved by Fleury does not arise). The approximation error exacerbates when a significant zoom is implemented, and the actual center of scaling, being not even on the 3D model object, causes some of the model to move out of view. Fleury at ¶¶ 3-5 and Figs. 1. Fleury solves the problem by associating a reference object, such as a virtual wire, as shown in Fig. 2, with the 3D object and restricts any operation on the 3D object to be implemented on a POI contained in

the reference object. When a user signals a translation, rotation or zoom, the POI is moved along the reference shape. Thus, a Fleury POI is a point in ***model space***. The POI in Fleury has certain restrictions within the model space, namely to be within the reference shape. As described in the present specification, an optimum viewing point is a point in ***display space***. As a result, Fleury's POI cannot possibly teach the optimum viewing point of claim 1. As noted above, some of the confusion in the Office Action as to the meaning of "optimum viewing point" may have led the Office Action to mistakenly read the POI of Fleury onto it.

Not only is Fleury silent as to both an optimum viewing point in the display space, but Fleury is also silent as to automatically moving a model zoom point within the display space to such an optimum viewing point concurrent with a zoom operation. The method of claim 1 is simply not concerned with creating a data structure called a reference shape and then restricting a ***model space*** point of interest to be within that data structure. While this may be of use for virtual oil wells, it is of no use to general 3D visualization systems where complex 3D representations of anatomical structures are examined, as shown in Figs. 12-18. The method of claim 1 allows a user to freely choose a model zoom point anywhere in the model space and then conveniently moves it to an optimal viewing point in the ***display space*** for him. Thus, claim 1 and the related independent claims 28, 30 and 32 are urged as patentable over Guedalia and Fleury, whether alone or in combination.

For similar reasons, the remaining dependent claims are also urged as patentable over these references as well.

If any issues remain open, or if the distinction between the cited prior art and the pending claims is not seen as sufficiently clear, Applicants respectfully request a telephonic conference with the Examiner to hopefully resolve any remaining issues.

No other fee is believed to be due in connection with the submission of these papers. However, the Commissioner is hereby authorized to charge any fee deficiency or credit any overpayment to Deposit Account No. 50-0540.

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Respectfully submitted,

Aaron S. Haleva, Reg. No. 44,733
KRAMER LEVIN NAFTALIS & FRANKEL LLP
1177 Avenue of the Americas
New York, New York 10036
Tel.: (212) 715-7773
Fax.: (212) 715-9397